

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application. No new matter has been introduced by way of the claim amendments. Current additions to the claims are noted with underlined text. Current deletions from the claims are indicated by text ~~striking through~~ or ~~[[double bracketing]]~~. The status of each claim is indicated in parenthetical expression following the claim number.

WHAT IS CLAIMED IS:

1. (Currently Amended) A method comprising:
 - a) providing functionalized carbon nanotubes,
wherein the functionalized carbon nanotubes ~~comprise a functionalized species on the sidewall of the carbon nanotubes~~ are selected from the group consisting of:
 - (i) aryl halide functionalized carbon nanotubes, and
 - (ii) carbon nanotubes comprising specie comprising a nucleation sites operable for initiating a polymerization reaction selected from the group consisting of anionic polymerization and or ring opening polymerization;
 - b) dispersing ~~thesaid aryl halide~~ functionalized carbon nanotubes in a solvent;
 - c) adding to the solvent at least one reagent selected from the group consisting of:
 - (i) an alkyl lithium species, ~~wherein the alkyl lithium species reacts with the aryl halide functionalized carbon nanotubes;~~
 - (ii) a metal, and ~~wherein the metal reacts with the aryl halide functionalized carbon nanotubes and replaces aryl halide bonds with aryl metal bonds;~~
 - (iii) a deprotonating agent, ~~wherein the deprotonating agent deprotonates the nucleation sites of the functionalized carbon nanotubes and form initiator groups for the anionic or ring opening polymerization;~~wherein the at least one reagent reacts with the functionalized carbon nanotubes to form a polymerizable species;
wherein the polymerizable species is selected from the group consisting of an aryl-lithium species comprising aryl-lithium bonds, an aryl-metal species comprising aryl-metal bonds, and initiator groups;
wherein deprotonation of the nucleation sites forms the

initiator groups:

- d) adding a monomer to the solvent; and
- e) initiating a polymerization reaction ~~anionic or ring opening polymerization~~ between ~~utilizing~~ the monomer and the polymerizable species ~~functionalized carbon~~ nanotubes to form a polymer-carbon nanotube material,

wherein the polymerization reaction is selected from the group consisting of anionic polymerization and ring opening polymerization.

2. (Currently Amended) A method comprising:

- a) providing aryl halide functionalized carbon nanotubes;
- b) dispersing ~~thesaid~~ aryl halide functionalized carbon nanotubes in a solvent;
- c) adding an alkyllithium species to the solvent,

wherein the alkyllithium species reacts with the aryl halide functionalized carbon nanotubes to form an aryl-lithium species comprising aryl-lithium bonds;

- d) adding a monomer to the solvent; and
- e) initiating a polymerization reaction ~~anionic or ring opening polymerization~~ between ~~utilizing~~ the monomer and the aryl-lithium species ~~functionalized carbon~~ nanotubes to form a polymer-carbon nanotube material,

wherein the polymerization reaction is selected from the group consisting of anionic polymerization and ring opening polymerization.

3. (Currently Amended) A method comprising:

- a) providing aryl halide functionalized carbon nanotubes;
- b) dispersing the aryl halide functionalized carbon nanotubes in a solvent;
- c) adding a metal to the solvent,

wherein the metal reacts with the aryl halide functionalized carbon nanotubes to form and replaces aryl halide bonds with an aryl-metal species comprising aryl-metal bonds;

- d) adding a monomer to the solvent; and
- e) initiating a polymerization reaction ~~anionic or ring opening polymerization~~ between ~~utilizing~~ the monomer and the aryl-metal species ~~functionalized carbon~~ nanotubes to form a polymer-carbon nanotube material,

wherein the polymerization reaction is selected from the group consisting of anionic polymerization and ring opening polymerization.

4. (Currently Amended) The method of Claim 3, wherein the metal ~~is comprises a substance~~ selected from the group consisting of ~~include~~ zinc, nickel, potassium, sodium, lithium, magnesium, cesium, palladium, and combinations thereof.
5. (Currently Amended) The method of Claim 3, wherein the metal is Mg,
wherein the aryl-metal bonds are aryl-Mg bonds comprising which reaction with the aryl halide functionalized carbon nanotubes comprises formation of a Grignard species.
6. (Currently Amended) The method of any one of Claims 1 – 5~~Claims 1-4 or 5~~, wherein ~~the carbon nanotubes have~~ the aryl halides are bonded to the sidewall of the aryl halide functionalized carbon nanotubes.
7. (Currently Amended) The methods of any one of Claims 1 – 5~~Claims 1-4 or 5~~, wherein the aryl halide comprises a halide selected from the group consisting of chlorine, bromine, iodine, and combinations thereof.
8. (Currently Amended) The methods of any one of Claims 1 – 5~~Claims 1-4 or 5~~, wherein the aryl halide is an aryl bromide.
9. (Currently Amended) The methods of any one of Claims 1 or 2~~Claims 1-4, or 5~~, wherein the alkyllithium species is n-butyllithium.
10. (Currently Amended) A method comprising:
 - a) providing functionalized carbon nanotubes,
wherein the specie-functionalized on the carbon nanotubes comprise nucleation sites for a polymerization reaction; at least one initiation site operable for
wherein the polymerization reaction is selected from the group consisting of anionic polymerization and or ring opening polymerization;
 - b) dispersing the functionalized carbon nanotubes in a solvent;
 - c) adding a deprotonating agent to the solvent,

wherein the deprotonating agent deprotonates the nucleation sites of the ~~functionalized carbon nanotubes and to form initiator groups for the anionic or ring opening polymerization reaction;~~

- d) adding a monomer to the solvent; and
- e) initiating ~~anionic or ring opening~~ a polymerization reaction between utilizing the monomer and the initiator groups ~~functionalized carbon nanotubes~~ to form a polymer-carbon nanotube material;

wherein the polymerization reaction is selected from the group consisting of anionic polymerization and ring opening polymerization.

- 11. (Currently Amended) The method of Claim 10, wherein the nucleation sites ~~of the functionalized carbon nanotubes~~ comprise ~~are~~ at least one of the elements selected from the group consisting of carbon, sulfur, oxygen, and nitrogen.
- 12. (Original) The method of Claim 10, wherein the functionalized carbon nanotubes are selected from the group consisting of phenol functionalized carbon nanotubes, thiophenol functionalized carbon nanotubes, phenethyl alcohol functionalized nanotubes (CNT-C₆H₄-CH₂CH₂OH), CNT-C₆H₄-NHBoc, and combinations thereof.
- 13. (Currently Amended) The method of any one of Claims 10 – 12 ~~Claims 10-11 or 12~~, wherein the nucleation sites are on the sidewall of the functionalized carbon nanotubes. ~~species functionalized on the carbon nanotubes is functionalized on the sidewall of the carbon nanotubes~~
- 14. (Currently Amended) The method of any one of Claims 10 – 12 ~~Claims 10-11 or 12~~, wherein the deprotonating agent comprises a base.
- 15. (Original) The method of Claim 14, wherein the base is selected from the group consisting of KOH, KH, NaOH, NaH, and potassium hexamethyldisilazide.
- 16. (Currently Amended) The method of any one of Claims 10 – 12 ~~Claims 10-11 or 12~~, wherein the deprotonating agent comprises a metal operable for deprotonating the nucleation sites.

17. (Original) The method of Claim 16, wherein the metal is selected from the group consisting of zinc, nickel, potassium, sodium, lithium, magnesium, cesium, palladium, and combinations thereof.
18. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11, or 12~~, wherein the initiating ~~anionic or ring opening polymerization~~ step comprises initiating anionic polymerization ~~to form the polymer carbon nanotube material~~.
19. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11, or 12~~, wherein the initiating ~~anionic or ring opening polymerization~~ step comprises initiating ring opening polymerization ~~to form the polymer carbon nanotube material~~.
20. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, wherein the functionalized carbon nanotubes are single-wall carbon nanotubes.
21. (Currently Amended) The methods of any one of Claims 2 – 5 or 10 – 12~~Claims 2 – 5, 10 – 11 or 12~~, wherein the solvent is tetrahydrofuran.
22. (Currently Amended) The methods of any one of Claims 2 – 5 or 10 – 12~~Claims 2 – 5, 10 – 11 or 12~~, wherein the monomer is selected from the group consisting of styrene, acrylates, methyl acrylates, vinyl acetate, vinyl pyridines, isoprene, butadiene, chloroprene, acrylonitrile, maleic anhydride, and combinations thereof.
23. (Currently Amended) The methods of any one of Claims 2 – 5 or 10 – 12~~Claims 2 – 5, 10 – 11 or 12~~, wherein the monomer comprises styrene.
24. (Currently Amended) The methods of any one of Claims 2 – 5 or 10 – 12~~Claims 2 – 5, 10 – 11 or 12~~, further comprising adding a ~~suitable~~ terminating agent suitable for terminating the ~~anionic or ring opening polymerization reaction process~~.
25. (Original) The method of Claim 24, wherein the terminating agent is selected from the group consisting of ethanol, acetaldehyde, trimethylsilyl chloride, and combinations thereof.
26. (Original) The method of Claim 24, wherein the terminating agent is ethanol.

27. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, wherein a concentration of the monomer is in the range between about 0.03 and about 0.16 g/ml.
28. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, wherein the step of initiating step anionic polymerization occurs at a temperature in the range between about 0°C and about 50°C.
29. (Cancelled)
30. (Cancelled)
31. (Currently Amended) The methods of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, further comprising adding a polymerization catalyst to the solvent~~wherein a catalyst is used during the step of initiating anionic or ring opening polymerization.~~
32. (Currently Amended) The method of Claim 31, wherein the polymerization catalyst comprises TiCl_4 .
33. (Currently Amended) The method of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, further comprising the a step of utilizing the polymer-carbon nanotube material in a drug delivery process.
34. (Currently Amended) The method of any one of Claims 1 – 5 or 10 – 12~~Claims 1 – 5, 10 – 11 or 12~~, further comprising the a step of utilizing the polymer-carbon nanotube material for scaffolding to promote cellular tissue growth.